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(71)Applicant : **MITSUBISHI ENG PLAST CORP**
(72)Inventor : **MORIMOTO KAORU**
WATANABE NORIYOSHI

(54) POLYAMIDE RESIN COMPOSITION

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a polyamide resin compsn. which is excellent in elastic modulus and heat resistance and can be used for producing a molded article having a high crystallinity and an excellent appearance even at a relatively low mold temp.
SOLUTION: This compsn. is prepd. by compounding 100 pts.wt. polyamide resin mixture comprising (A) 20-90 wt.% polyamide 6 resin and (B) 10-80 wt.% arom. polyamide resin with (C) 45-150 pts.wt. inorg. filler, the arom. polyamide resin consisting mainly of a polyamide formed by the polycondensation of a diamine mixture comprising 10-50 mol.% p-xylylenediamine and 50-90 mol.% m-xylylenediamine with an aliph. dicarboxylic acid.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the polyamide resin constituent which can obtain the mold goods which were excellent in intensity and the elastic modulus, and were excellent in a moldability, especially surface appearance in detail about a polyamide resin constituent.

[0002]

[Description of the Prior Art] Polyamide resin is excellent in toughness, chemicals-proof nature, the electrical property, etc., and is used in each field, such as autoparts, a machine part, and electrical-and-electric-equipment parts, as a molding material. Especially, the polyamide 6 is excellent in toughness and chemicals-proof nature, and is adopted as many products as extrusion-molding material, such as a monofilament, a film, and a sheet, and an injection-molding material.

[0003] Moreover, by blending the inorganic system bulking agent represented by the glass fiber, many attempts which raise thermal resistance and a mechanical property are performed, and lightweight-izing of the product by metal alternative and an economical effect are produced. However, the decline in the elastic modulus in the field which there is a limitation in improvement in the elastic modulus by adding an inorganic bulking agent, and exceeded the glass transition point is remarkable, and its design-restrictions are large in the replacement to plastics from a metal.

[0004] As opposed to such a problem, the polyamide resin which consists of a terephthalic acid and/or an isophthalic acid, and a hexamethylenediamine is indicated by JP,63-101420,A, JP,63-105057,A, etc., and the polyamide resin which consists of an adipic acid and a meta key silylene diamine is indicated by JP,50-61449,A etc., and is used for the metal alternative field. However, its glass transition point is high, and if these polyamide resin is not set as a high die temperature about 120 degrees C or more in case it is injection molding, it is very difficult to obtain mold goods excellent in a heat-resistant property, appearance, especially gloss.

[0005]

[Problem(s) to be Solved by the Invention] The purpose of this invention is to offer the polyamide resin constituent which can obtain the mold goods which have the appearance which was excellent in a bending elastic modulus and thermal resistance, was high also in the comparatively low die temperature, and was excellent. [of degree of crystallinity]

[0006]

[Means for Solving the Problem] It is made in order that this invention may solve an above-mentioned problem. the summary (A) in the mixed polyamide resin 100 weight section which consists of 20 - 90 % of the weight of polyamide 6 resins, and 10 - 80 % of the weight of (B) aromatic-polyamide resins (C) It comes to blend the inorganic packing 45 - the 150 weight sections. this aromatic-polyamide resin It consists in the polyamide resin constituent which is polyamide resin which makes a principal component the polyamide obtained from the polycondensation reaction of the mixed diamine and aliphatic dicarboxylic acid containing 10-50 mol % of PARAKI silylene diamines, and 50-90 mol % of meta key silylene diamines.

[0007] Hereafter, it explains to a detail per this invention. as (A) polyamide 6 resin in this invention -- a caprolactam unit -- more than 90 mol % -- it is the polyamide which it has and the unit which consists of a comonomer component except a caprolactam unit may be contained As a unit which consists of a comonomer component except a caprolactam unit, omega-RAURO lactam etc. is mentioned, for example.

[0008] The relative viscosity of polyamide 6 resin is the concentration in 98% sulfuric acid of 1g / 100ml, and measurement conditions with a temperature of 25 degrees C, and is 1.8-3.5 preferably. If too high [if relative viscosity is too low, a mechanical strength is inadequate, and], a moldability will fall. The relative viscosity of polyamide 6 resin is 2.0-3.2 more preferably, and is 2.1-3.0 most preferably.

[0009] It is polyamide resin which makes a principal component the polyamide obtained in a PARAKI silylene diamine as a (B) aromatic-polyamide resin in this invention from the polycondensation reaction of the mixed diamine and aliphatic dicarboxylic acid containing 10 - 50-mol % and meta key silylene diamine 50 - 90-mol %.

[0010] The melting point of the polyamide resin which will be obtained if the crystallization speed of the polyamide obtained as a PARAKI silylene diamine is less than [10 mol %] in a mixed diamine is small, tends to produce the fall of the fall of a moldability, deformation by poor crystallization of mold goods, or a mechanical strength and exceeds 50-mol % becomes high too much, it is easy to cause the heat deterioration by heating at the time of fabrication, and fabrication becomes less easy. As a mixed diamine, it is the mixed diamine which is a mixed diamine which becomes 20-45-mol % from 55-80-mol % about a meta key

silylene diamine in a PARAKI silylene diamine, and becomes 20-40-mol % from 60-80-mol % about a meta key silylene diamine in a PARAKI silylene diamine most preferably.
[0011] As a diamine in the mixed diamine containing a PARAKI silylene diamine and a meta key silylene diamine, an aliphatic diamine, an aromatic diamine, and an alicycle group diamine are mentioned in addition to a PARAKI silylene diamine and a meta key silylene diamine. Diamine rates other than the PARAKI silylene diamine in a mixed diamine and a meta key silylene diamine are less than [of all diamines / 10 mol %] preferably, and are less than [of all diamines / 5 mol %] more preferably.
[0012] As an aliphatic diamine, a tetramethylenediamine, a pentamethylene diamine, a hexamethylenediamine, an octamethylene diamine, a nonamethylene diamine, etc. are mentioned, for example, as an aromatic diamine, a meta-phenylenediamine, a p phenylenediamine, etc. are mentioned, for example, and 1, 3-screw aminomethyl cyclohexane, 1, and 4-screw aminomethyl cyclohexane etc. is mentioned as an alicycle group diamine, for example.
[0013] As an aliphatic dicarboxylic acid, an alpha and omega-aliphatic dicarboxylic acid is mentioned preferably. The carbon numbers of an aliphatic dicarboxylic acid are 6-12 preferably. As an example of an aliphatic dicarboxylic acid, an adipic acid, a succinic acid, a glutaric acid, a pimelic acid, a suberic acid, an azelaic acid, a sebacic acid, undecane diacid, dodecane diacid, etc. are mentioned.
[0014] In an aromatic-polyamide resin, an aromatic dicarboxylic acid little in addition to an aliphatic dicarboxylic acid can be used. As an aromatic dicarboxylic acid, 1 and 5-naphthalene dicarboxylic acid etc. is mentioned, for example. The rate of an aromatic dicarboxylic acid is less than [of all dicarboxylic acids / 10 mol %], and is less than [5 mol %] more preferably.
[0015] The relative viscosity of an aromatic-polyamide resin is the concentration in 96% sulfuric acid of 1g / 100ml, and measurement at the temperature of 25 degrees C, and is 1.6-3.0 preferably. If too high [if relative viscosity is too low, a mechanical strength is inadequate, and], a moldability will fall. The relative viscosity of an aromatic-polyamide resin is 1.7-2.9 more preferably, and is 1.8-2.8 most preferably.
[0016] As mixed polyamide resin in this invention, it consists of (A) polyamide 6 resin and a (B) aromatic-polyamide resin, and the ratios of (A) polyamide 6 resin and (B) aromatic-polyamide resin are 20 - 90 % of the weight / 10 - 80 % of the weight. If it is difficult to acquire good appearance with polyamide 6 resin being less than 20 % of the weight and it exceeds 90 % of the weight, the elastic modulus in an elevated temperature will tend to fall. (A) The ratios of polyamide 6 resin and (B) aromatic-polyamide resin are 25 - 85 % of the weight / 15 - 75 % of the weight preferably.
[0017] (C) -- as inorganic packing -- fibrous and powder -- a combined use object is mentioned in inorganic packing of the shape of granular and flakes, and these As a fibrous bulking agent, the whisker of a glass fiber, a potassium titanate, or a calcium sulfate, a carbon fiber, an alumina fiber, etc. are mentioned. In order to acquire the outstanding appearance property, as for the diameter of average fiber of fibrous packing, it is desirable that it is 14 micrometers or less. As mean fiber length of fibrous packing, 500 micrometers or less are 200 micrometers or less in mold goods still more preferably in mold goods preferably. The measuring method of the diameter of average fiber of fibrous packing and mean fiber length is based on a microscopic method.
[0018] powder -- as an inorganic bulking agent of the shape of granular or flakes, sulfates, such as carbonates, such as a kaolinite, a silica, a mica, talc, clay, glass flakes, a glass bead, a potassium titanate, a wollastonite, a calcium carbonate, and a magnesium carbonate, a calcium sulfate, and magnesium sulfate, a sulfide, a metallic oxide, etc. are mentioned In the resin constituent of this invention, in order to promote crystallization of polyamide resin, it is desirable to blend talc powder. powder -- the mean particle diameter of a flakes-like inorganic bulking agent is desirable granular, and it is 50 micrometers or less If a mean particle diameter exceeds 50 micrometers, an appearance property will tend to fall. powder -- the mean particle diameter of a flakes-like inorganic bulking agent is still more desirable granular, and it is 40 micrometers or less The measuring method of the mean particle diameter of an inorganic bulking agent is based on a microscopic method.
[0019] (C) The loadings of an inorganic bulking agent are the 45 - 150 weight section to the mixed polyamide resin 100 weight section which consists of 20 - 90 % of the weight of (A) polyamide 6 resins, and 10 - 80 % of the weight of (B) aromatic-polyamide resins, and are the 50 - 130 weight section preferably. If many [if there are too few loadings of an inorganic bulking agent, an elastic modulus will tend to fall, and / too], it is difficult to acquire good product appearance.
[0020] In the polyamide resin constituent of this invention, the stabilizer to degradation by other additive, for example, antistatic agent, lubricant, plasticizers, oxidization, heat, and ultraviolet rays etc. can be blended if needed. In order to manufacture the polyamide resin constituent of this invention, the method of using the well-known combination method, for example, carrying out melting kneading of the raw material after combination using the extruder of a monopodium or two shafts with a blender etc. is mentioned. A bending elastic modulus is 7 or more GPas at 10 or more GPas and 80 degrees C in a room temperature, and the polyamide resin constituent of this invention gives the mold goods in which a moldability and the glossiness of the front face of the mold goods especially fabricated by the general die temperature (70-90 degrees C) with the metal mold of mirror-plane polish finishing of No. 3000 have the excellent gloss which is 80% or more.
[0021] Hereafter, although an example explains this invention still in detail, this invention is not limited to the following examples, unless the summary is exceeded.
[Example] The following were used for each component in an example and the example of comparison.
(1) Polyamide 6 resin : nova MIDDO 1008 made from Mitsubishi Engineering Plastics, relative viscosity 2.3.
(2) Aromatic-polyamide resin : aromatic-polyamide A obtained in the example 1 of reference.
(3) Aromatic-polyamide resin : aromatic-polyamide B obtained in the example 2 of reference.
[0022] (4) -- inorganic bulking agent: -- talc and Wood Chemicals micron white 5000A and 4.1 micrometers of mean particle diameters

(5) -- inorganic bulking agent: -- a glass fiber, ECSby Nippon Electric Glass Co., Ltd.03T-296GH, 10 micrometers of diameters of average fiber, and 150 micrometers of mean fiber length
[0023] [Example 1 of reference] Heating melting of the adipic acid was carried out within the reaction can of nitrogen atmosphere. the melting dicarboxylic acid -- a PARAKI silylene diamine -- a 30-mol % and meta-xylylene diamine -- 70-mol % -- the mixed xylylene diamine to contain was dropped serially, and it stirred, maintaining reaction temperature so that it may always exceed the melting point of a product After the dropping end, when stirring and the reaction were continued and attained until it reached predetermined viscosity, from the reaction can, water cooling of the product was discharged and carried out, and it was pelletized. The melting point of obtained aromatic-polyamide A was 206 degrees C in 258 degrees C and crystallization temperature, and relative viscosity (1g of 96% sulfuric-acid solutions, 100ml) was 2.08.
[0024] [Example 2 of reference] Heating melting of the adipic acid was carried out within the reaction can of nitrogen atmosphere. the melting dicarboxylic acid -- a PARAKI silylene diamine -- a 50-mol % and meta-xylylene diamine -- 50-mol % -- the mixed xylylene diamine and meta-xylylene diamine to contain -- final -- PARAKI silylene diamine 40 mol % -- meta--- it divided into two stages and was serially dropped so that it might become xylylene diamine 60 mol %, and it stirred, maintaining reaction temperature so that it may always exceed the melting point of a product After the dropping end, when stirring and the reaction were continued and attained until it reached predetermined viscosity, from the reaction can, water cooling of the product was discharged and carried out, and it was pelletized. The melting point of obtained aromatic-polyamide B was 227 degrees C in 269 degrees C and crystallization temperature, and relative viscosity (1g of 96% sulfuric-acid solutions, 100ml) was 2.13.
[0025] Evaluation was based on the following methods.
(1) degree-of-crystallinity measurement: -- the percent display of the value which covered the DSC method and mold goods with a thickness of 1.6mm over DSC (differential scanning calorimetry), and **(ed) the total of a melting peak area, and the difference of a non-crystallized peak area (low-temperature crystallization peak area) by the melting heating value of a theoretical crystal -- it carried out
(2) Bending test : ASTM D790 (23 degrees C or 80 degrees C)
(3) Appearance evaluation : the disk with a diameter [of 100mm] and a thickness of 3mm was fabricated, and glossiness was measured by the glossmeter.
[0026] [Example 1] After having carried out 75 weight sections and aromatic-polyamide A for polyamide 6 resin, carrying out 2 weight sections combination of the 100 weight sections and the talc for 25 weight sections and the glass fiber and carrying out melting kneading at 280 degrees C of cylinder temperatures using a vent formula single screw extruder (product made from NAKATANI Machine), water cooling was carried out and it pelletized. Width of face of 13mm, a length of 100mm, the test piece for degree-of-crystallinity measurement with a thickness of 1.6mm, the test piece for bending tests, and 100mm disk test piece for appearance evaluation were fabricated with the injection molding machine using the pellet of the obtained resin constituent. An evaluation result is shown in Table -1.
[0027] [Example 2] In the example 1, except making polyamide 6 resin into 60 weight sections, and making aromatic-polyamide A into 40 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.
[Example 3] In the example 1, except making polyamide 6 resin into 30 weight sections, and making aromatic-polyamide A into 70 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.
[0028] [Example 1 of comparison] In the example 1, polyamide 6 resin was made into the 100 weight sections, except not using aromatic-polyamide A, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.
[Example 2 of comparison] In the example 1, except making polyamide 6 resin into 10 weight sections, and making aromatic-polyamide A into 90 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.
[Example 3 of comparison] In the example 1, not using polyamide 6 resin, the pellet was obtained like the example 1 and the test piece was fabricated except making aromatic-polyamide A into the 100 weight sections. An evaluation result is shown in Table 1.

[0029] [Example 4] In the example 1, except making a glass fiber into 50 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[Example 5] In the example 1, except making a glass fiber into the 150 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[0030] [Example 4 of comparison] In the example 1, except making a glass fiber into 40 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[Example 5 of comparison] In the example 1, except making a glass fiber into the 180 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[0031] [Example 6] In the example 1, except using aromatic-polyamide B instead of aromatic-polyamide A, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[0032]
[Table 1]

表－1

		実施例1	実施例2	実施例3	比較例1	比較例2	比較例3
ポリアミド6	(重量部)	75	60	30	100	10	
芳香族ポリアミドA	(重量部)	25	40	70		90	100
ガラス繊維	(重量部)	100	100	100	100	100	100
タルク	(重量部)	2	2	2	2	2	2
結晶化度	(%)	32	35	33	33	30	23
曲げ弾性率、23℃	(GPa)	15	16	16	12	16	17
曲げ弾性率、80℃	(GPa)	7.3	7.4	7.5	6.3	7.6	7.5
成形品光沢度		85	85	82	83	78	75

[0033]
[Table 2]
表－2

		実施例4	実施例5	比較例4	比較例5	実施例6
ポリアミド6	(重量部)	75	75	75	75	75
芳香族ポリアミドA	(重量部)	25	25	25	25	
芳香族ポリアミドB	(重量部)					25
ガラス繊維	(重量部)	50	150	40	180	100
タルク	(重量部)	2	2	2	2	2
結晶化度	(%)	32	32	33	33	34
曲げ弾性率、23℃	(GPa)	13	17	9	19	16
曲げ弾性率、80℃	(GPa)	7.0	7.8	5.9	8.0	7.8
成形品光沢度		85	80	85	72	80

[0034]
[Effect of the Invention] The polyamide resin constituent of this invention is excellent in a bending elastic modulus, decline in the elastic modulus in an elevated temperature is small excellent also in thermal resistance, it can obtain the mold goods of high degree of crystallinity and good appearance easily with low-temperature metal mold comparatively, and gives mold goods excellent in mechanical physical properties and gloss. Therefore, it is very useful as autoparts, the electrical and electric equipment, electronic parts, and various industrial parts.

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TECHNICAL FIELD

[The technical field to which invention belongs] this invention relates to the polyamide resin constituent which can obtain the mold goods which were excellent in intensity and the elastic modulus, and were excellent in a moldability, especially surface appearance in detail about a polyamide resin constituent.

[Translation done.]

PRIOR ART

[Description of the Prior Art] Polyamide resin is excellent in toughness, chemicals-proof nature, the electrical property, etc., and is used in each field, such as autoparts, a machine part, and electrical-and-electric-equipment parts, as a molding material. Especially, the polyamide 6 is excellent in toughness and chemicals-proof nature, and is adopted as many products as extrusion-molding material, such as a monofilament, a film, and a sheet, and an injection-molding material.

[0003] Moreover, by blending the inorganic system bulking agent represented by the glass fiber, many attempts which raise thermal resistance and a mechanical property are performed, and lightweight-izing of the product by metal alternative and an economical effect are produced. However, the decline in the elastic modulus in the field which there is a limitation in improvement in the elastic modulus by adding an inorganic bulking agent, and exceeded the glass transition point is remarkable, and its design-restrictions are large in the replacement to plastics from a metal.

[0004] As opposed to such a problem, the polyamide resin which consists of a terephthalic acid and/or an isophthalic acid, and a hexamethylenediamine is indicated by JP,63-101420,A, JP,63-105057,A, etc., and the polyamide resin which consists of an adipic acid and a meta key silylene diamine is indicated by JP,50-61449,A etc., and is used for the metal alternative field. However, its glass transition point is high, and if these polyamide resin is not set as a high die temperature about 120 degrees C or more in case it is injection molding, it is very difficult to obtain mold goods excellent in a heat-resistant property, appearance, especially gloss.

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EFFECT OF THE INVENTION

[Effect of the Invention] The polyamide resin constituent of this invention is excellent in a bending elastic modulus, decline in the elastic modulus in an elevated temperature is small excellent also in thermal resistance, it can obtain the mold goods of high degree of crystallinity and good appearance easily with low-temperature metal mold comparatively, and gives mold goods excellent in mechanical physical properties and gloss. Therefore, it is very useful as autoparts, the electrical and electric equipment, electronic parts, and various industrial parts.

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MEANS

[Means for Solving the Problem] It is made in order that this invention may solve an above-mentioned problem. the summary (A) in the mixed polyamide resin 100 weight section which consists of 20 - 90 % of the weight of polyamide 6 resins, and 10 - 80 % of the weight of (B) aromatic-polyamide resins (C) It comes to blend the inorganic packing 45 - the 150 weight sections. this aromatic-polyamide resin It consists in the polyamide resin constituent which is polyamide resin which makes a principal component the polyamide obtained from the polycondensation reaction of the mixed diamine and aliphatic dicarboxylic acid containing 10-50 mol % of PARAKI silylene diamines, and 50-90 mol % of meta key silylene diamines.

[0007] Hereafter, it explains to a detail per this invention. as (A) polyamide 6 resin in this invention -- a caprolactam unit -- more than 90 mol % -- it is the polyamide which it has and the unit which consists of a comonomer component except a caprolactam unit may be contained As a unit which consists of a comonomer component except a caprolactam unit, omega-RAURO lactam etc. is mentioned, for example.

[0008] The relative viscosity of polyamide 6 resin is the concentration in 98% sulfuric acid of 1g / 100ml, and measurement conditions with a temperature of 25 degrees C, and is 1.8-3.5 preferably. If too high [if relative viscosity is too low, a mechanical strength is inadequate, and], a moldability will fall. The relative viscosity of polyamide 6 resin is 2.0-3.2 more preferably, and is 2.1-3.0 most preferably.

[0009] It is polyamide resin which makes a principal component the polyamide obtained in a PARAKI silylene diamine as a (B) aromatic-polyamide resin in this invention from the polycondensation reaction of the mixed diamine and aliphatic dicarboxylic acid containing 10 - 50-mol % and meta key silylene diamine 50 - 90-mol %.

[0010] The melting point of the polyamide resin which will be obtained if the crystallization speed of the polyamide obtained as a PARAKI silylene diamine is less than [10 mol %] in a mixed diamine is small, tends to produce the fall of the fall of a moldability, deformation by poor crystallization of mold goods, or a mechanical strength and exceeds 50-mol % becomes high too much, it is easy to cause the heat deterioration by heating at the time of fabrication, and fabrication becomes less easy. As a mixed diamine, it is the mixed diamine which is a mixed diamine which becomes 20-45-mol % from 55-80-mol % about a meta key silylene diamine in a PARAKI silylene diamine, and becomes 20-40-mol % from 60-80-mol % about a meta key silylene diamine in a PARAKI silylene diamine most preferably.

[0011] As a diamine in the mixed diamine containing a PARAKI silylene diamine and a meta key silylene diamine, an aliphatic diamine, an aromatic diamine, and an alicycle group diamine are mentioned in addition to a PARAKI silylene diamine and a meta key silylene diamine. Diamine rates other than the PARAKI silylene diamine in a mixed diamine and a meta key silylene diamine are less than [of all diamines / 10 mol %] preferably, and are less than [of all diamines / 5 mol %] more preferably.

[0012] As an aliphatic diamine, a tetramethylenediamine, a pentamethylene diamine, a hexamethylenediamine, an octamethylene diamine, a nonamethylene diamine, etc. are mentioned, for example, as an aromatic diamine, a meta-phenylenediamine, a p phenylenediamine, etc. are mentioned, for example, and 1, 3-screw aminomethyl cyclohexane, 1, and 4-screw aminomethyl cyclohexane etc. is mentioned as an alicycle group diamine, for example.

[0013] As an aliphatic dicarboxylic acid, an alpha and omega-aliphatic dicarboxylic acid is mentioned preferably. The carbon numbers of an aliphatic dicarboxylic acid are 6-12 preferably. As an example of an aliphatic dicarboxylic acid, an adipic acid, a succinic acid, a glutaric acid, a pimelic acid, a suberic acid, an azelaic acid, a sebacic acid, undecane 2 acid, dodecane 2 acid, etc. are mentioned.

[0014] In an aromatic-polyamide resin, an aromatic dicarboxylic acid little in addition to an aliphatic dicarboxylic acid can be used. As an aromatic dicarboxylic acid, 1 and 5-naphthalene dicarboxylic acid etc. is mentioned, for example. The rate of an aromatic dicarboxylic acid is less than [of all dicarboxylic acids / 10 mol %], and is less than [5 mol %] more preferably.

[0015] The relative viscosity of an aromatic-polyamide resin is the concentration in 96% sulfuric acid of 1g / 100ml, and measurement at the temperature of 25 degrees C, and is 1.6-3.0 preferably. If too high [if relative viscosity is too low, a mechanical strength is inadequate, and], a moldability will fall. The relative viscosity of an aromatic-polyamide resin is 1.7-2.9 more preferably, and is 1.8-2.8 most preferably.

[0016] As mixed polyamide resin in this invention, it consists of (A) polyamide 6 resin and a (B) aromatic-polyamide resin, and the ratios of (A) polyamide 6 resin and (B) aromatic-polyamide resin are 20 - 90 % of the weight / 10 - 80 % of the weight. If it is difficult to acquire good appearance with polyamide 6 resin being less than 20 % of the weight and it exceeds 90 % of the weight, the elastic modulus in an elevated temperature will tend to fall. (A) The ratios of polyamide 6 resin and (B) aromatic-polyamide resin are 25 - 85 % of the weight / 15 - 75 % of the weight preferably.

[0017] (C) -- as inorganic packing -- fibrous and powder -- a combined use object is mentioned in inorganic packing of the shape of granular and flakes, and these As a fibrous bulking agent, the whisker of a glass fiber, a potassium titanate, or a calcium sulfate, a carbon fiber, an alumina fiber, etc. are mentioned. In order to acquire the outstanding appearance property, as for the diameter of average fiber of fibrous packing, it is desirable that it is 14 micrometers or less. As mean fiber length of fibrous packing, 500 micrometers or less are 200 micrometers or less in mold goods still more preferably in mold goods preferably. The measuring method of the diameter of average fiber of fibrous packing and mean fiber length is based on a microscopic method.
[0018] powder -- as an inorganic bulking agent of the shape of granular or flakes, sulfates, such as carbonates, such as a kaolinite, a silica, a mica, talc, clay, glass flakes, a glass bead, a potassium titanate, a wollastonite, a calcium carbonate, and a magnesium carbonate, a calcium sulfate, and magnesium sulfate, a sulfide, a metallic oxide, etc. are mentioned In the resin constituent of this invention, in order to promote crystallization of polyamide resin, it is desirable to blend talc powder. powder -- the mean particle diameter of a flakes-like inorganic bulking agent is desirable granular, and it is 50 micrometers or less If a mean particle diameter exceeds 50 micrometers, an appearance property will tend to fall. powder -- the mean particle diameter of a flakes-like inorganic bulking agent is still more desirable granular, and it is 40 micrometers or less The measuring method of the mean particle diameter of an inorganic bulking agent is based on a microscopic method.
[0019] (C) The loadings of an inorganic bulking agent are the 45 - 150 weight section to the mixed polyamide resin 100 weight section which consists of 20 - 90 % of the weight of (A) polyamide 6 resins, and 10 - 80 % of the weight of (B) aromatic-polyamide resins, and are the 50 - 130 weight section preferably. If many [if there are too few loadings of an inorganic bulking agent, an elastic modulus will tend to fall, and / too], it is difficult to acquire good product appearance.
[0020] In the polyamide resin constituent of this invention, the stabilizer to degradation by other additive, for example, antistatic agent, lubricant, plasticizers, oxidization, heat, and ultraviolet rays etc. can be blended if needed. In order to manufacture the polyamide resin constituent of this invention, the method of using the well-known combination method, for example, carrying out melting kneading of the raw material after combination using the extruder of a monopodium or two shafts with a blender etc. is mentioned. A bending elastic modulus is 7 or more GPas at 10 or more GPas and 80 degrees C in a room temperature, and the polyamide resin constituent of this invention gives the mold goods in which a moldability and the glossiness of the front face of the mold goods especially fabricated by the general die temperature (70-90 degrees C) with the metal mold of mirror-plane polish finishing of No. 3000 have the excellent gloss which is 80% or more.
[0021] Hereafter, although an example explains this invention still in detail, this invention is not limited to the following examples, unless the summary is exceeded.

[Translation done.]

EXAMPLE

[Example] The following were used for each component in an example and the example of comparison.
(1) Polyamide 6 resin : nova MIDDO 1008 made from Mitsubishi Engineering Plastics, relative viscosity 2.3.
(2) Aromatic-polyamide resin : aromatic-polyamide A obtained in the example 1 of reference.
(3) Aromatic-polyamide resin : aromatic-polyamide B obtained in the example 2 of reference.
[0022] (4) -- inorganic bulking agent: -- talc and Wood Chemicals micron white 5000A and 4.1 micrometers of mean particle diameters
(5) -- inorganic bulking agent: -- a glass fiber, ECSby Nippon Electric Glass Co., Ltd.03T-296GH, 10 micrometers of diameters of average fiber, and 150 micrometers of mean fiber length
[0023] [Example 1 of reference] Heating melting of the adipic acid was carried out within the reaction can of nitrogen atmosphere. the melting dicarboxylic acid -- a PARAKI silylene diamine -- a 30-mol % and meta key silylene diamine -- 70-mol % -- the mixed KISHIRI range amine to contain was dropped serially, and it stirred, maintaining reaction temperature so that it may always exceed the melting point of a product After the dropping end, when stirring and the reaction were continued and attained until it reached predetermined viscosity, from the reaction can, water cooling of the product was discharged and carried out, and it was pelletized. The melting point of obtained aromatic-polyamide A was 206 degrees C in 258 degrees C and crystallization temperature, and relative viscosity (1g of 96% sulfuric-acid solutions, 100ml) was 2.08.
[0024] [Example 2 of reference] Heating melting of the adipic acid was carried out within the reaction can of nitrogen atmosphere. the melting dicarboxylic acid -- a PARAKI silylene diamine -- a 50-mol % and meta key silylene diamine -- 50-mol % -- the mixed KISHIRI range amine and meta key silylene diamine to contain were divided into two stages, and were serially dropped so that it might finally become PARAKI silylene diamine 40 mol % and meta key silylene diamine 60 mol %, and it stirred, maintaining reaction temperature so that it may always exceed the melting point of a product After the dropping end, when stirring and the reaction were continued and attained until it reached predetermined viscosity, from the reaction can, water cooling of the product was discharged and carried out, and it was pelletized. The melting point of obtained aromatic-polyamide B was 227 degrees C in 269 degrees C and crystallization temperature, and relative viscosity (1g of 96% sulfuric-acid solutions, 100ml) was 2.13.
[0025] Evaluation was based on the following methods.
(1) degree-of-crystallinity measurement: -- the percent display of the value which covered the DSC method and mold goods with a thickness of 1.6mm over DSC (differential scanning calorimetry), and **(ed) the total of a melting peak area, and the difference of a non-crystallized peak area (low-temperature crystallization peak area) by the melting heating value of a theoretical crystal -- it carried out
(2) Bending test : ASTM D790 (23 degrees C or 80 degrees C)
(3) Appearance evaluation : the disk with a diameter [of 100mm] and a thickness of 3mm was fabricated, and glossiness was measured by the glossmeter.
[0026] [Example 1] After having carried out 75 weight sections and aromatic-polyamide A for polyamide 6 resin, carrying out 2 weight sections combination of the 100 weight sections and the talc for 25 weight sections and the glass fiber and carrying out melting kneading at 280 degrees C of cylinder temperatures using a vent formula single screw extruder (product made from NAKATANI Machine), water cooling was carried out and it pelletized. Width of face of 13mm, a length of 100mm, the test piece for degree-of-crystallinity measurement with a thickness of 1.6mm, the test piece for bending tests, and 100mm disk test piece for appearance evaluation were fabricated with the injection molding machine using the pellet of the obtained resin constituent. An evaluation result is shown in Table -1.
[0027] [Example 2] In the example 1, except making polyamide 6 resin into 60 weight sections, and making aromatic-polyamide A into 40 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.
[Example 3] In the example 1, except making polyamide 6 resin into 30 weight sections, and making aromatic-polyamide A into 70 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.
[0028] [Example 1 of comparison] In the example 1, polyamide 6 resin was made into the 100 weight sections, except not using aromatic-polyamide A, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.

[Example 2 of comparison] In the example 1, except making polyamide 6 resin into 10 weight sections, and making aromatic-polyamide A into 90 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table 1.
[Example 3 of comparison] In the example 1, not using polyamide 6 resin, the pellet was obtained like the example 1 and the test piece was fabricated except making aromatic-polyamide A into the 100 weight sections. An evaluation result is shown in Table 1.

[0029] [Example 4] In the example 1, except making a glass fiber into 50 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[Example 5] In the example 1, except making a glass fiber into the 150 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[0030] [Example 4 of comparison] In the example 1, except making a glass fiber into 40 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[Example 5 of comparison] In the example 1, except making a glass fiber into the 180 weight sections, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[0031] [Example 6] In the example 1, except using aromatic-polyamide B instead of aromatic-polyamide A, the pellet was obtained like the example 1 and the test piece was fabricated. An evaluation result is shown in Table -2.
[0032]
[Table 1]
表－1

	実施例1	実施例2	実施例3	比較例1	比較例2	比較例3
ポリアミド6 (重量部)	75	60	30	100	10	
芳香族ポリアミドA (重量部)	25	40	70		90	100
ガラス繊維 (重量部)	100	100	100	100	100	100
タルク (重量部)	2	2	2	2	2	2
結晶化度 (%)	32	35	33	33	30	23
曲げ弾性率、23℃ (GPa)	15	16	16	12	16	17
曲げ弾性率、80℃ (GPa)	7.3	7.4	7.5	6.3	7.6	7.5
成形品光沢度	85	85	82	83	78	75

[0033]
[Table 2]
表－2

	実施例4	実施例5	比較例4	比較例5	実施例6
ポリアミド6 (重量部)	75	75	75	75	75
芳香族ポリアミドA (重量部)	25	25	25	25	
芳香族ポリアミドB (重量部)					25
ガラス繊維 (重量部)	50	150	40	180	100
タルク (重量部)	2	2	2	2	2
結晶化度 (%)	32	32	33	33	34
曲げ弾性率、23℃ (GPa)	13	17	9	19	16
曲げ弾性率、80℃ (GPa)	7.0	7.8	5.9	8.0	7.8
成形品光沢度	85	80	85	72	80

[Translation done.]

* NOTICES *

1. This document has been translated by computer.So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] (A) The polyamide resin constituent which is polyamide resin which makes a principal component the polyamide obtained from the polycondensation reaction of the mixed diamine and aliphatic dicarboxylic acid to which it comes to blend the (C) inorganic packing 45 - the 150 weight sections with the mixed polyamide resin 100 weight section which consists of 20 - 90 % of the weight of polyamide 6 resins, and 10 - 80 % of the weight of (B) aromatic-polyamide resins, and this aromatic-polyamide resin contains PARAKI silylene diamine 10 - 50-mol % and meta key silylene diamine 50 - 90-mol % in
[Claim 2] The polyamide resin constituent according to claim 1 with which relative viscosity of polyamide 6 resin is characterized by being 1.8-3.5.
[Claim 3] The polyamide resin constituent according to claim 1 or 2 characterized by a mixed diamine being a mixed diamine containing 20-45 mol % of PARAKI silylene diamines, and 55-80 mol % of meta key silylene diamines.
[Claim 4] The polyamide resin constituent according to claim 1 to 3 with which an aliphatic dicarboxylic acid is characterized by being alpha and omega-straight chain aliphatic dicarboxylic acid.
[Claim 5] The polyamide resin constituent according to claim 1 to 4 with which an aliphatic dicarboxylic acid is characterized by being the aliphatic dicarboxylic acid of carbon numbers 6-12.
[Claim 6] The polyamide resin constituent according to claim 1 to 5 with which relative viscosity of an aromatic-polyamide resin is characterized by being 1.6-3.0.
[Claim 7] The polyamide resin constituent according to claim 1 to 6 with which inorganic packing is characterized by fibrous packing of 14 micrometers or less of diameters of average fiber or the powder of 50 micrometers or less of mean particle diameters, and being granular or flakes-like packing.

[Translation done.]

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(71)出願人　594137579
三菱エンジニアリングプラスチックス株式会社
東京都中央区京橋一丁目１番１号

(72)発明者　森本　肇
神奈川県平塚市東八幡５－６－２　三菱エンジニアリングプラスチックス株式会社技術センター内

(72)発明者　渡辺　宣義
神奈川県平塚市東八幡５－６－２　三菱エンジニアリングプラスチックス株式会社技術センター内

(74)代理人　弁理士　長谷川　曉司

(54)【発明の名称】　ポリアミド樹脂組成物

(57)【要約】

【課題】　弾性率と耐熱性に優れ、比較的低い金型温度においても結晶化度の高く、優れた外観を有する成形品を得ることができるポリアミド樹脂組成物を提供する。

【解決手段】　（Ａ）ポリアミド６樹脂２０～９０重量％と（Ｂ）芳香族ポリアミド樹脂１０～８０重量％とからなる混合ポリアミド樹脂１００重量部に、（Ｃ）無機充填物４５～１５０重量部を配合してなり、該芳香族ポリアミド樹脂が、パラキシリレンジアミン１０～５０モル％とメタキシリレンジアミン５０～９０モル％とを含む混合ジアミンと脂肪族ジカルボン酸との重縮合反応より得られるポリアミドを主成分とするポリアミド樹脂であるポリアミド樹脂組成物。

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【特許請求の範囲】

【請求項1】　(A)ポリアミド6樹脂20～90重量%と(B)芳香族ポリアミド樹脂10～80重量%とからなる混合ポリアミド樹脂100重量部に、(C)無機充填物45～150重量部を配合してなり、該芳香族ポリアミド樹脂が、パラキシリレンジアミン10～50モル%とメタキシリレンジアミン50～90モル%とを含む混合ジアミンと脂肪族ジカルボン酸との重縮合反応より得られるポリアミドを主成分とするポリアミド樹脂であるポリアミド樹脂組成物。

【請求項2】　ポリアミド6樹脂の相対粘度が、1．8～3．5であることを特徴とする請求項1に記載のポリアミド樹脂組成物。

【請求項3】　混合ジアミンが、パラキシリレンジアミン20～45モル%とメタキシリレンジアミン55～80モル%を含む混合ジアミンであることを特徴とする請求項1または2に記載のポリアミド樹脂組成物。

【請求項4】　脂肪族ジカルボン酸が、α，ω－直鎖脂肪族ジカルボン酸であることを特徴とする請求項1ないし3のいずれかに記載のポリアミド樹脂組成物。

【請求項5】　脂肪族ジカルボン酸が、炭素数6～12の脂肪族ジカルボン酸であることを特徴とする請求項1ないし4のいずれかに記載のポリアミド樹脂組成物。

【請求項6】　芳香族ポリアミド樹脂の相対粘度が、1．6～3．0であることを特徴とする請求項1ないし5のいずれかに記載のポリアミド樹脂組成物。

【請求項7】　無機充填物が、平均繊維径14μm以下の繊維状充填物または平均粒径50μm以下の粉末状、粒状若しくはフレーク状充填物であることを特徴とする請求項1ないし6のいずれかに記載のポリアミド樹脂組成物。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、ポリアミド樹脂組成物に関し、詳しくは、強度と弾性率に優れ、且つ成形性、特に表面外観に優れた成形品を得ることができるポリアミド樹脂組成物に関する。

【0002】

【従来の技術】ポリアミド樹脂は、靭性、耐化学薬品性、電気特性等に優れており、成形材料として自動車部品、機械部品、電気・電子機器部品等の各分野において利用されている。中でもポリアミド6は、靭性、耐化学薬品性に優れておりモノフィラメント、フィルム、シート等の押し出し成形材料、射出成形材料として多くの製品に採用されている。

【0003】また、ガラス繊維に代表される無機系充填剤を配合することにより、耐熱性、機械的特性を向上させる試みが数多く行われ、金属代替による製品の軽量化、経済的効果を生みだしてきている。しかしながら、無機充填剤を添加することによる弾性率の向上には限界

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があり、また、そのガラス転移点を越えた領域での弾性率の低下は著しく、金属からプラスチックへの置き換えにおいて、設計的制約が大きい。

【0004】こうした問題に対し、例えば、テレフタル酸および／またはイソフタル酸とヘキサメチレンジアミンからなるポリアミド樹脂が、特開昭63－101420号公報や特開昭63－105057号公報等に開示され、アジピン酸とメタキシリレンジアミンからなるポリアミド樹脂が、特開昭50－61449号公報等に開示されており、金属代替分野に利用されている。しかしながら、これらのポリアミド樹脂はガラス転移点が高く、射出成形の際、120℃程度以上の高い金型温度に設定しなければ、耐熱特性や外観、特に光沢に優れた成形品を得ることはきわめて困難である。

【0005】

【発明が解決しようとする課題】本発明の目的は、曲げ弾性率と耐熱性に優れ、比較的低い金型温度においても結晶化度の高く、優れた外観を有する成形品を得ることができるポリアミド樹脂組成物を提供することにある。

【0006】

【課題を解決するための手段】本発明は上述の問題を解決するためになされたものであり、その要旨は、(A)ポリアミド6樹脂20～90重量%と(B)芳香族ポリアミド樹脂10～80重量%とからなる混合ポリアミド樹脂100重量部に、(C)無機充填物45～150重量部を配合してなり、該芳香族ポリアミド樹脂が、パラキシリレンジアミン10～50モル%とメタキシリレンジアミン50～90モル%とを含む混合ジアミンと脂肪族ジカルボン酸との重縮合反応より得られるポリアミドを主成分とするポリアミド樹脂であるポリアミド樹脂組成物に存する。

【0007】以下、本発明につき詳細に説明する。本発明における(A)ポリアミド6樹脂としては、カプロラクタム単位を90モル%以上有するポリアミドであり、カプロラクタム単位以外コモノマー成分からなる単位を含有していてもよい。カプロラクタム単位以外コモノマー成分からなる単位としては、例えばω－ラウロラクタムなどが挙げられる。

【0008】ポリアミド6樹脂の相対粘度は、98%硫酸中濃度1g／100ml、温度25℃での測定条件で、好ましくは1．8～3．5である。相対粘度が低すぎると機械的強度が不十分であり、高すぎると成形性が低下する。ポリアミド6樹脂の相対粘度は、より好ましくは2．0～3．2であり、最も好ましくは2．1～3．0である。

【0009】本発明における(B)芳香族ポリアミド樹脂としては、パラキシリレンジアミンを10～50モル%とメタキシリレンジアミン50～90モル%とを含む混合ジアミンと脂肪族ジカルボン酸との重縮合反応より得られるポリアミドを主成分とするポリアミド樹脂であ

る。

【0010】混合ジアミンにおいてパラキシリレンジアミンが10モル%未満であると得られるポリアミドの結晶化速度が小さく、成形性の低下や成形品の結晶化不良による変形や機械的強度の低下を生じやすく、50モル%を超えると得られるポリアミド樹脂の融点が高くなりすぎ、成形時の加熱による熱劣化を引き起こし易く、成形が容易でなくなる。混合ジアミンとしては、より好ましくは、パラキシリレンジアミンを20～45モル%とメタキシリレンジアミンを55～80モル%とからなる混合ジアミンであり、最も好ましくは、パラキシリレンジアミンを20～40モル%とメタキシリレンジアミンを60～80モル%とからなる混合ジアミンである。

【0011】パラキシリレンジアミンとメタキシリレンジアミンを含む混合ジアミンにおけるジアミンとしては、パラキシリレンジアミンとメタキシリレンジアミン以外に脂肪族ジアミン、芳香族ジアミンおよび脂環族ジアミンが挙げられる。混合ジアミンにおけるパラキシリレンジアミンとメタキシリレンジアミン以外のジアミン割合は、好ましくは全ジアミンの10モル%以下であり、より好ましくは全ジアミンの5モル%以下である。

【0012】脂肪族ジアミンとしては、例えばテトラメチレンジアミン、ペンタメチレンジアミン、ヘキサメチレンジアミン、オクタメチレンジアミン、ノナメチレンジアミン等が挙げられ、芳香族ジアミンとしては、例えばメタフェニレンジアミン、パラフェニレンジアミン等が挙げられ、脂環族ジアミンとしては、例えば1，3－ビスアミノメチルシクロヘキサン、1，4－ビスアミノメチルシクロヘキサン等が挙げられる。

【0013】脂肪族ジカルボン酸としては、好ましくはα，ω－脂肪族ジカルボン酸が挙げられる。脂肪族ジカルボン酸の炭素数は、好ましくは6～12である。脂肪族ジカルボン酸の具体例としては、アジピン酸、コハク酸、グルタル酸、ピメリン酸、スベリン酸、アゼライン酸、セバシン酸、ウンデカン二酸、ドデカン二酸等が挙げられる。

【0014】芳香族ポリアミド樹脂においては、脂肪族ジカルボン酸以外に少量の芳香族ジカルボン酸を使用することができる。芳香族ジカルボン酸としては、例えば1，5－ナフタレンジカルボン酸等が挙げられる。芳香族ジカルボン酸の割合は、好ましくは、全ジカルボン酸の10モル%以下であり、より好ましくは5モル%以下である。

【0015】芳香族ポリアミド樹脂の相対粘度は、96%硫酸中濃度1g／100ml、温度25℃での測定で、好ましくは1．6～3．0である。相対粘度が低すぎると機械的強度が不十分であり、高すぎると成形性が低下する。芳香族ポリアミド樹脂の相対粘度は、より好ましくは1．7～2．9であり、最も好ましくは1．8～2．8である。

【0016】本発明における混合ポリアミド樹脂としては、（A）ポリアミド6樹脂と（B）芳香族ポリアミド樹脂とからなり、（A）ポリアミド6樹脂と（B）芳香族ポリアミド樹脂との比率は20～90重量%／10～80重量%である。ポリアミド6樹脂が20重量%未満であると良好な外観を得ることが困難であり、90重量%を越えると高温での弾性率が低下しやすい。（A）ポリアミド6樹脂と（B）芳香族ポリアミド樹脂との比率は、好ましくは25～85重量%／15～75重量%である。

【0017】（C）無機充填物としては、繊維状、粉末状、粒状およびフレーク状の無機充填物並びにこれらを併用物が挙げられる。繊維状充填剤としては、ガラス繊維、チタン酸カリウムや硫酸カルシウムのウィスカー、カーボン繊維、アルミナ繊維等が挙げられる。繊維状充填物の平均繊維径は、優れた外観特性を得るために14μm以下であることが好ましい。繊維状充填物の平均繊維長としては、好ましくは、成形品中で500μm以下、さらに好ましくは成形品中で200μm以下である。繊維状充填物の平均繊維径および平均繊維長の測定方法は、顕微鏡法による。

【0018】粉末状、粒状またはフレーク状の無機充填剤としては、カオリナイト、シリカ、マイカ、タルク、クレー、ガラスフレーク、ガラスビーズ、チタン酸カリウム、ウォラストナイト、炭酸カルシウム、炭酸マグネシウムなどの炭酸塩、硫酸カルシウム、硫酸マグネシウムなどの硫酸塩、硫化物および金属酸化物等が挙げられる。本発明の樹脂組成物においては、ポリアミド樹脂の結晶化を促進するためにタルク粉末を配合することが好ましい。粉末状、粒状またはフレーク状の無機充填剤の平均粒径は、好ましくは50μm以下である。平均粒径が50μmを越えると外観特性が低下しやすい。粉末状、粒状またはフレーク状の無機充填剤の平均粒径は、さらに好ましくは40μm以下である。無機充填剤の平均粒径の測定方法は、顕微鏡法による。

【0019】（C）無機充填剤の配合量は、（A）ポリアミド6樹脂20～90重量%と（B）芳香族ポリアミド樹脂10～80重量%とからなる混合ポリアミド樹脂100重量部に対し、45～150重量部であり、好ましくは50～130重量部である。無機充填剤の配合量が少なすぎると弾性率が低下しやすく、多すぎると良好な製品外観を得ることが困難である。

【0020】本発明のポリアミド樹脂組成物においては、必要に応じて、他の添加剤、例えば、帯電防止剤、滑剤、可塑剤、酸化、熱及び紫外線による劣化に対する安定剤等を配合することができる。本発明のポリアミド樹脂組成物を製造するには、公知の配合方法を用いることができ、例えば、原料をブレンダー等で配合後、単軸または二軸の押出機を用いて溶融混練する方法が挙げられる。本発明のポリアミド樹脂組成物は、曲げ弾性率が

室温で10GPa以上、80℃で7GPa以上であり、成形性、特に一般的な金型温度（70～90℃）で鏡面研き3000番仕上げの金型で成形した成形品の表面の光沢度が80%以上である優れる光沢を持つ成形品を与える。

【0021】以下、本発明を実施例により更に詳細に説明するが、本発明はその要旨を超えない限り、以下の実施例に限定されるものではない。

【実施例】実施例及び比較例における各成分は、以下のものを使用した。

（1）ポリアミド6樹脂：三菱エンジニアリングプラスチックス（株）製ノバミッド1008、相対粘度2.3。

（2）芳香族ポリアミド樹脂：参考例1で得られた芳香族ポリアミドA。

（3）芳香族ポリアミド樹脂：参考例2で得られた芳香族ポリアミドB。

【0022】（4）無機充填剤：タルク、林化成（株）製ミクロンホワイト5000A、平均粒径4.1μm。

（5）無機充填剤：ガラス繊維、日本電気硝子（株）製ECS03T－296GH、平均繊維径10μm、平均繊維長150μm。

【0023】〔参考例1〕アジピン酸を窒素雰囲気の反応缶内で加熱溶融させた。その溶融ジカルボン酸に、パラキシリレンジアミンを30モル%、メタキシリレンジアミンを70モル%含有する混合キシリレンジアミンを逐次滴下し、生成物の融点を常に上回るように反応温度を保ちつつ撹拌した。滴下終了後、所定の粘度に達するまで撹拌、反応を続け、達した時点で生成物を反応缶より排出し、水冷し、ペレット化した。得られた芳香族ポリアミドAの融点は258℃、結晶化温度206℃、相対粘度（96%硫酸溶液1g／100ml）は2.08であった。

【0024】〔参考例2〕アジピン酸を窒素雰囲気の反応缶内で加熱溶融させた。その溶融ジカルボン酸に、パラキシリレンジアミンを50モル%、メタキシリレンジアミンを50モル%含有する混合キシリレンジアミンとメタキシリレンジアミンとを最終的にパラキシリレンジアミン40モル%、メタキシリレンジアミン60モル%となるように2段階に分けて逐次滴下し、生成物の融点を常に上回るように反応温度を保ちつつ撹拌した。滴下終了後、所定の粘度に達するまで撹拌、反応を続け、達した時点で生成物を反応缶より排出し、水冷し、ペレット化した。得られた芳香族ポリアミドBの融点は269℃、結晶化温度227℃、相対粘度（96%硫酸溶液1g／100ml）は2.13であった。

【0025】評価は以下の方法によった。

（1）結晶化度測定：DSC法、厚さ1.6mmの成形品をDSC（示差走査熱量測定）にかけ、溶融ピーク面積の総計と未結晶ピーク面積（低温結晶化ピーク面積）の差を理論結晶の溶融熱量で除した値のパーセント表示した。

（2）曲げ試験：ASTM D790（23℃または80℃）

（3）外観評価：直径100mm、厚さ3mmの円板を成形し、光沢度計で光沢度を測定した。

【0026】〔実施例1〕ポリアミド6樹脂を75重量部、芳香族ポリアミドAを25重量部、ガラス繊維を100重量部、タルクを2重量部配合し、ベント式単軸押出機（ナカタニ機械（株）製）を用いて、シリンダー温度280℃で溶融混練した後、水冷し、ペレット化した。得られた樹脂組成物のペレットを用いて、射出成形機にて、幅13mm、長さ100mm、厚さ1.6mmの結晶化度測定用テストピース、曲げ試験用テストピース及び外観評価用100mm円板テストピースを成形した。評価結果を表－1に示す。

【0027】〔実施例2〕実施例1において、ポリアミド6樹脂を60重量部、芳香族ポリアミドAを40重量部にすること以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表1に示す。

〔実施例3〕実施例1において、ポリアミド6樹脂を30重量部、芳香族ポリアミドAを70重量部にすること以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表1に示す。

【0028】〔比較例1〕実施例1において、ポリアミド6樹脂を100重量部にし、芳香族ポリアミドAを用いないこと以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表1に示す。

〔比較例2〕実施例1において、ポリアミド6樹脂を10重量部、芳香族ポリアミドAを90重量部にすること以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表1に示す。

〔比較例3〕実施例1において、ポリアミド6樹脂を用いず、芳香族ポリアミドAを100重量部にすること以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表1に示す。

【0029】〔実施例4〕実施例1において、ガラス繊維を50重量部にすること以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表－2に示す。

〔実施例5〕実施例1において、ガラス繊維を150重量部にすること以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表－2に示す。

【0030】〔比較例4〕実施例1において、ガラス繊維を40重量部にすること以外は実施例1と同様にしてペレットを得、テストピースを成形した。評価結果を表－2に示す。

〔比較例5〕実施例1において、ガラス繊維を180重量部にすること以外は実施例1と同様にしてペレットを

得、テストピースを成形した。評価結果を表－２に示す。

【００３１】〔実施例６〕実施例１において、芳香族ポリアミドＡの代わりに芳香族ポリアミドＢを用いること＊

表－１

	実施例1	実施例2	実施例3	比較例1	比較例2	比較例3
ポリアミド６ （重量部）	75	60	30	100	10	
芳香族ポリアミドＡ （重量部）	25	40	70		90	100
ガラス繊維 （重量部）	100	100	100	100	100	100
タルク （重量部）	2	2	2	2	2	2
結晶化度 （％）	32	35	33	33	30	23
曲げ弾性率、23℃ （GPa）	15	16	16	12	16	17
曲げ弾性率、80℃ （GPa）	7.3	7.4	7.5	6.3	7.6	7.5
成形品光沢度	85	85	82	83	78	75

※　※【表２】

【００３３】

表－２

	実施例4	実施例5	比較例4	比較例5	実施例6
ポリアミド６ （重量部）	75	75	75	75	75
芳香族ポリアミドＡ （重量部）	25	25	25	25	
芳香族ポリアミドＢ （重量部）					25
ガラス繊維 （重量部）	50	150	40	180	100
タルク （重量部）	2	2	2	2	2
結晶化度 （％）	32	32	33	33	34
曲げ弾性率、23℃ （GPa）	13	17	9	19	16
曲げ弾性率、80℃ （GPa）	7.0	7.8	5.9	8.0	7.8
成形品光沢度	85	80	85	72	80

【００３４】

【発明の効果】本発明のポリアミド樹脂組成物は、曲げ弾性率に優れ、高温での弾性率の低下が小さく耐熱性にも優れ、比較的低温の金型で容易に高い結晶化度と良好★な外観の成形品を得ることができ、機械的物性と光沢に優れた成形品を与える。従って、自動車部品、電気、電子部品および各種工業部品として非常に有用である。

＊以外は実施例１と同様にしてペレットを得、テストピースを成形した。評価結果を表－２に示す。

【００３２】

【表１】